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THE FOOD, AGRIBUSINESS AND RURAL MARKETS (FARM) PROJECT

THE GROUNDNUT VALUE CHAIN AND VALUE- ADDITION OPPORTUNITIES

Contract No.: EDH-I-00-05-00005-00



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DISCLAIMER

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I. INTRODUCTION

I.1. Food, Agribusiness and Rural Markets (FARM) Project

The Food, Agribusiness and Rural Markets (FARM) Project, funded by the United States Agency for International Development (USAID), seeks to promote agricultural productivity and enhance the market competitiveness of selected agricultural crops. Increased surplus production will lead to improved security and lower prices for consumers and at the same time transform the farmer into a more commercially viable producer.

Value-addition is a vital step up the value chain towards market diversification for farmer produce in South Sudan. Strategies for value-addition are being implemented within the FARM Project for crops such as cassava. The project is also looking into promoting the expansion of value-addition for maize and groundnuts.

I.2. Purpose of the Report

The purpose of the report is to examine the current situation of value addition for groundnuts and the opportunities for, and constraints on, expanding value addition faced by the principal actors along the groundnut value chain. This study falls under the FARM project Component 2: Trade and Marketing, which is intended to increase the market competitiveness through value addition to commodities produced by project-supported farmers. The FARM project Annual Work Plan: October 2012 to September 2013 proposed a pilot program of groundnut oil production.

Groundnuts are an important crop in South Sudan, both for food and cash. Groundnuts are cultivated in most of the states of South Sudan, although Western, Central, and Eastern Equatoria States are the top three groundnut-producing states.¹ Groundnuts are traded in various forms and utilized for direct consumption and processing. The groundnut subsector along with the overall agricultural sector have been affected by decades of civil conflict and lack of investment, and continue to face the challenges of limited production, weak market development and poor physical infrastructure.

The feasibility of value-addition opportunities in the groundnut value chain are examined below through the lens of:

1. Market attractiveness and viability: Will the current consumer base be attracted to the new product and will they have the means to purchase it?
2. Economics of production: Can value-added production in the groundnut value chain be justified on a cost basis and availability of raw commodities?
3. Capital and investment: What capital resources are required to facilitate ongoing or new value addition opportunities?

¹ Food and Agriculture Organization and World Food Programme. "Crop and Food Security Assessment Mission to South Sudan." February 2013.

The report covered the groundnut sub-sector primarily in Yei County in Central Equatoria State (CES), and also areas in Western Equatoria State (WES) where the FARM Project operates, namely Yambio County. Because of time and logistic constraints, the consultant did not extend the assessment to Eastern Equatoria and other groundnut producing areas. The justification for concentrating in Yei County was the comparatively higher volume of groundnut production in that county and the predominance of the *Red Beauty* variety which is commonly traded.

There is limited detailed and qualitative data on the groundnut subsector in South Sudan. Most of what is available in the public realm are *ad hoc* reports produced by NGOs, and generalized crop data focusing mainly on yields, such as the FAO/WFP Crop and Food Security Mission to South Sudan. The information and analyses presented in this report build upon previous assessments of the groundnut subsector supported by the FARM project. This report is not an exhaustive study of the groundnut subsector. The consultant conducted informal interviews with paste sellers, paste makers, groundnut traders, and groundnut farmers in Yei Town, Lasu and Otego Payams of Yei County, and Yambio Town in Yambio County throughout July and August 2013. The consultant also conducted a literature review concerning value-addition technology and products for groundnuts.

2. THE GROUNDNUT SUBSECTOR

Groundnuts are produced by a large number of smallholder farmers after which the available harvest traverses a rather flat market channel ending up in local markets where the unshelled groundnuts are first sold. As a commercial crop, groundnuts in Western and Central Equatoria States rank third in importance behind maize and cassava.² Groundnuts have the potential for expanded value-addition, especially in the edible oil market, but this potential must be examined in terms of the status of the actors and activities throughout the value chain.

2.1. Farmers and Production

Groundnuts in CES and WES are mostly grown on plots smaller than two feddans.³ There are two seasons for groundnuts; the first begins in March with harvesting from August to September; the second begins in August with harvesting from December to January. According to the Yei County extension officer,⁴ Yei farmers prefer the second season for groundnut cultivation, while in Yambio County, farmers tend to prefer the first season. Farmers generally use hand cultivation practices for these small plots and employ family members to carry out land preparation, harvest, and post-harvest activities. Mechanical production is not always possible because of the cost. Average production costs:⁵

Cost Description	Unit Cost (SSP)
Clearing and tree uprooting	250 to 400 (tree uprooting)/feddan. Cost can be allocated over a 2-3 season period.
Plowing	250 to 300/feddan
Harrowing	180/feddan
Weeding	150/feddan for weeding if a person is hired; double this rate if two people are hired.
Est. Total Cost/Feddan	600 – 1,000

This table does not include possible costs incurred for planting, harvesting, or any post-harvest activities. Labor availability is often inconstant. In CES, for example, able-bodied men often opt out of field work to work as motorbike (*boda-boda*) operators in the larger towns. The cost of paying labor in-kind through the provision of food and drink to family members for plowing and harrowing may equal, or even exceed, the

² Based on interviews with FARM production coordinators in Yambio and Yei.

³ The FARM Project estimates that for all agricultural production, 80% of farmers cultivate on 2 feddans or less.

⁴ Esther Kiden. Agriculture Extension Officer Yei County

⁵ Some cost figures taken from “Value Chain Analysis” by Charity Rojo 2013.

cost of hiring tractors.⁶ In Yei County, in the absence of local labor, farmers may hire Congolese migrants, using the prevailing labor rates. Farmers are frustrated by their limited ability to hire seasonal, stable, and relatively low-cost labor, be it mechanical or manual. The scarcity of farm labor remains a significant constraint to opening up more land for cultivation in the Greenbelt.

Farmers in CES and WES cultivate the improved varieties *Red Beauty*, *Serenut*, *Igola*, as well as a number of local varieties. *Red Beauty* is of the Valencia class of groundnuts, a red-colored nut with above average oil content (40-50 percent); *Serenut* is of the Spanish class, a tan-colored nut and *Igola* is a red seed coat with an upright bunch growth habit.

The *Red Beauty* variety matures in 3-5 months and top-end yields can approach 1,900 to 2,550kg/ha, according to the variety potential.⁷ Groundnut yields are constrained by disease, pest infestation, and unpredictable rainfall. This past season, farmers in Yei County also reported poor germination rates. Groundnut Rosette Disease, a viral disease prevalent in South Sudan, can lead to total crop loss. Measures to mitigate losses to this disease have involved introducing disease-resistant cultivars. Dry spells in May 2013 have affected current harvests and have created hospitable environments for pests such as termites, which in WES bore into harvested pods.

Harvest and post-harvest activities also present challenges. How these activities are handled—and particularly how farmers manage the drying and storage of groundnuts during problematic climatic conditions—can influence the quality of the groundnuts and the quantity available for marketing. Failure to harvest on time, or failure to complete a harvest, can result in production shortfalls that make the difference between a profitable season and an unprofitable one.

Farmers have indicated that it can take them up to four days to harvest their groundnuts by hand if they work alone. Not drying sufficiently after the harvest can lead to spoilage or promote the growth of *Aspergillus flavus*, a fungus that produces *aflatoxin*, which can be fatal to consumers. Farmers in Yei County have reported that it takes three to four days to dry groundnuts adequately. The farmers have neither the humidity meters to measure the moisture content of their groundnuts, nor the test kits to test for *aflatoxin*,⁸ but they are aware that *aflatoxin* exists. Proper storage is also an issue with farmers as many of them suffer post-harvest losses from moisture-related spoilage and rodents. Farmers who have become part of an FBO are now able to store their groundnuts in a common storage unit.⁹

Groundnut yields average seven bags per feddan or 315 kilograms.¹⁰ Farmers participating under the FARM project posted average groundnut yields of 350 kilograms per feddan in 2012, which was a marked increase over the baseline yield of 290 kilograms.¹¹ Farmers interviewed by the consultant in Yei County reported yields ranging from 240 kilograms to 405 kilograms with an average of 314 kilograms per feddan.¹² One of the farmers interviewed cultivated three feddans but the rest cultivated two feddans or less. Farmers in Yambio County realized similar yields, averaging 350 kilograms per feddan. When compared to production in other states, such as Northern Bahr el Ghazal, groundnut yields in CES and WES are slightly lower than the

⁶ Meeting with FARM Agricultural Production Coordinator in WES (7/18/13) and Yei County Extension Officer (August 2013).

⁷ Kalu Okello, David. "Groundnut Production Guide for Uganda." NARO. 2012.

⁸ Farmers interviewed during the field visits were generally aware of Aflatoxin.

⁹ This is the case of "Kolashima" FBO located in Ombassi boma, Otego Payam.

¹⁰ Weights per bag vary, ranging from 45 to 50 kg, depending on how the bags are filled.

¹¹ Interview with FARM Agricultural Production Director, 7/26/13.

¹² Interviews with seven farmers throughout Otego and Lasu Payams (August 2013).

eight to nine bags per feddan or 400 to 450 kilograms farmers get in that state.¹³ Yields in this first season of 2013 were affected by a dry spell in May and poor seed germination.

The price of groundnuts varies across different markets and fluctuates throughout the year. Farmers interviewed in Ombassi Market in Yei County reported selling their unshelled groundnuts for prices varying from 10 SSP to 13 SSP per bucket;¹⁴ this is the equivalent of 150 SSP to 195 SSP/45kg bag, or 3.3 SSP/kg to 4.3 SSP/kg. Groundnut prices in the main Yei market approximated the same prices as those in the Ombassi market, possibly indicating that farmers flock to Yei to sell their groundnuts. Prices also varied significantly in Yei market, as women selling at the retail level reported buying bags of groundnuts for prices ranging from a low of 110 SSP/bag, (2.4 SSP/kg), to a high of 120 SSP/bag, (2.7 SSP/kg). Farmers also reported that their groundnuts are transported all the way to the Juba markets where one bucket sells for 180 SSP–270 SSP/bag, 6 SSP/kg. In a different market, such as that of Yambio, prices are slightly lower. As reported by one farmer,¹⁵ a gallon, (3.5kg), sells for 7 SSP or 2 SSP/kg, and the same gallon sells for 8 SSP at the retail level. However, the consultant observed a bucket of groundnuts (approximately one gallon), selling in the Yambio market for 5 SSP per gallon, indicating that the farmer's quoted price represented some wishful thinking. Prices of all commodities can fluctuate drastically, especially during the hunger gap at the end of the dry season. A basin (in this case, 5kg) of groundnuts which normally sells at 25 SSP retail (20 SSP farm gate) can reach a high of 40 SSP. The seasonal fluctuations in price can be extreme in WES and present problems with regards to price stability. There is also the problem of groundnuts flooding into local markets from the Greater Bahr el Ghazal states, making it more difficult for farmers in WES to sell off their groundnuts for a profit. In comparing market prices in WES and CES to neighboring countries such as Uganda, we find the price for unshelled groundnuts ranges from 3,000 to 3,300 USh/kg, roughly 5 SSP/kg, which is on par with prices in Juba.

Groundnut farmers say they face these challenges:

- Poor germination
- Erratic rains or dry spells
- Plant disease, e.g. Rosette Virus
- Pest infestation, e.g. termites, pod borers
- High labor costs or limited supply of labor
- Transport constraints

2.2. Actors along the Groundnut Market Channel

2.2.1 Farmers

Farmers sell groundnuts unshelled to local traders, regional buyers, or at the weekly market. At times, farmers may travel to larger markets in the regional trading centers where they sell directly to retailers. Unshelled groundnuts are traded in bags, but the units of measurement for pricing purposes at the farmer level are either buckets or basins. Since there are no certified standards of weights and measurement, and hanging scales may not always be available during sales transactions, farmers accept the method of scooping out the groundnuts in buckets to arrive at agreed-upon sales weights. The consultant observed this practice both at the weekly market in Ombassi and the Yei markets. As indicated in reference notes above, a bucket of unshelled groundnuts weighs approximately 3kg while a basin weighs about 4.5kg. The consultant observed that 15 buckets or 10 basins constitute one bag, 45kg. Assisting farmers to adopt standard weights

¹³ Based on consultant's previous experience with groundnut yields while working in Aweil in 2012.

¹⁴ One bucket of unshelled groundnuts equals 3 kg.

¹⁵ Natalie Zingisi, a progressive farmer

and measures is important because farmers or sellers may be giving away more than they should when they overfill their buckets or basins.

Getting the groundnuts to market is hampered by the high cost of transport. The main modes of transport are the motorbike (*boda boda*) and the tipper truck, which vary in capacity but are mostly in the range of 3-5mt capacity. Transport is also affected by poor roads and weather. In Lasu Payam, , Yei County CES, during rainy periods, farmers' sole recourse to get groundnuts to market is via motorbike, which can cost 30 SSP per trip. Even in light of these costs, farmers may still bring their crops to market at a loss—knowingly or unknowingly—just to sell their groundnuts.¹⁶ If the roads are better, as in the case of the Ootogo Payam, more tipper trucks are available, and the farmers, especially those in FBOs, have more opportunity to engage in bulk marketing. Though no transport rates were collected in Yei County, in Yambio County, farmers indicated that transporting a load of 2mt or more over a 15 mile distance would cost 700 SSP. Options to address irregular transport for those market-ready FBOs wanting to sell in bulk: contract tipper trucks during harvest periods through a leasing scheme financed by loans or grants, or subsidize the purchase of a three to five ton tipper truck for a cooperative union.¹⁷

2.2.2 Buyers/Retailers

Farmers engage in direct sales of their groundnuts, sometimes to traders. There is no data as to the number of traders or retailers in WES or CES.¹⁸ Traders travel to meet with farmers directly, or meet them at the weekly markets to buy groundnuts. The traders organize transport and loaders, and negotiate with the farmers. Some buyers already have established relations with farmers, but in other cases, like WES, some farmers indicated that they do not engage with traders or know them personally.

One buyer in the Yei market indicated that during the harvest season he travels all over Yei County and up to Lainya County to buy groundnuts. He averages 10 bags per week. He buys groundnuts at a price of 10-13 SSP per bucket and sells in the market at a price between 16-20 SSP per bucket. He runs his business on a cash basis, restocking his inventory only after he has enough capital from his profits. He said that his main constraint is the lack of credit.¹⁹ If he had credit, he would buy more bags during each visit to a farmer. He said the groundnut market in August 2013 was undersupplied, which may be in part due to the depleted inventories of the previous season and the incomplete current harvest.

The retailer, usually female, sells a variety of items—beans, cowpeas, rice, coffee, and cooking oil—along with groundnuts. The difference between the retailer and the trader is that she sells groundnuts shelled. The retailers interviewed do not travel outside of Yei to buy; they meet farmers at the outskirts of the markets to buy the unshelled groundnuts. Typically, a retailer shells²⁰ the groundnuts herself and sells a basin, approximately 15 kg, for 120 SSP; a bucket for 60 SSP; a half bucket for 30 SSP; and a cup for 3 SSP. These

¹⁶ The consultant met one woman in Mongo Boma, Ootogo Payam, who paid a *boda boda* 30 SSP so that she could travel to the Yei market to sell a bag of groundnuts for 20 SSP.

¹⁷ When inquiring about the prices of used tipper lorries in Juba, drivers quoted prices of \$10k or less; online, the consultant found used tipper lorries in South Africa for \$10k or less. The cooperative union would pay 30%, say \$3,500, up front towards the purchase price. For example, each trip in Yambio for a tipper lorry is approximately \$165. If 10 trips are made during the course of two cropping seasons, i.e. \$1,650, then over a period of two calendar years the cooperative union might have already spent \$3k in transport.

¹⁸ In Ombassi Boma, Ootogo Payam, the head of a trading association stated that there are 380 traders in Ootogo Payam.

¹⁹ This is not true. According to the extension officer, there is a micro-finance institution, *Finance Sudan* that offers trader loans in the amount of 500 SSP with interest payments of 100 SSP.

²⁰ People do not normally know the cost of shelling groundnuts. For maize, it is usually 10 SSP for every 100kg of shelled maize. In inquiring about this cost, the Yei County Extension Officer said that 10 SSP per 100kg would be too much, but 5 SSP would be acceptable if one were to hire to have groundnuts shelled.

retailers claim they buy unshelled groundnuts for 100 to 120 SSP per bag, which is below the price for which farmers say they sell groundnuts. Since the retailer performs a value-added service, her profit per bag would approximately be: 240 SSP (two basins) – 120 SSP (bag of groundnuts) – 5 SSP for shelling²¹ = 115 SSP which is her gross profit and does not include stall costs. The retailers say that it can take a week to clear one bag, but also claim that if they had the capital, they would buy more bags.

Both traders and retailers in Yei feel threatened by farmers selling in the market, especially when the local radio show broadcasts prices. Farmers respond by flocking to the Yei market to sell their groundnuts, often undercutting established retailers even though these farmers do not profit because of transport costs.

Buyers, traders, and retailers along the market chain serve an import function in channeling the flow of goods from the farmer to the eventual consumer. They have a customer base, and they are known in the market through their continued presence. One possibility for the FARM project to assist these traders would be to link them up with a few FBOs and encourage the FBOs to develop a contractual arrangement whereby the trader could obtain an allotment of groundnuts on a credit basis, perhaps providing for a small down payment with a schedule of repayments at a nominal rate of interest. The buyer would present a simple credit application describing where he lives, the location of his place of business and his marketing plan to qualify for such credit.

2.3. Groundnut Value Addition Activities and Actors

Groundnuts have the potential to be processed into a variety of products, resulting in expanded opportunities throughout the subsector. Besides shelled, groundnuts can be marketed as roasted, roasted salted/flavored, or processed into paste, butter, flour or oil. In South Sudan, groundnuts are processed into paste and flour.

2.3.1. Shelling Services

There are no professional shelling services. Shelling of groundnuts is done by hand at the farm level by the families or in the market by individual groundnut sellers. Shelling represents a considerable gain in value: A 45kg bag can yield approximately 30kg of shelled groundnuts, a possible 33 percent increase in value addition at 225 SSP/kg shelled vs 75 SSP/kg unshelled. Since hand shelling is time-consuming— one study found shelling 6.5kg of Red Beauty groundnuts took 1 hour 42 minutes²²—offering mechanical services to the public, besides lessening the drudgery of shelling, could also accelerate the process of bringing market-ready groundnuts to the retail level.

2.3.2. Paste Makers

The groundnut paste business would not exist without the service provision of the paste makers. Typically, paste-making is a side business to another business such as a maize grinding mill or a retail store where the owner turns on the machine when a client enters to have their groundnuts made into paste. The paste maker charges 1 SSP per kg of raw groundnuts²³ before they are crushed. How long it takes to crush paste depends on the power source. One paste maker visited by the consultant in Yei was powering his unit from the electrical grid, which, he said, can convert 10 kg of groundnuts into paste in eight minutes. It is more normal to use an 8hp diesel engine as the power source. Another paste maker took 30 minutes to convert 10kg of groundnuts into paste. The cost of running a paste making unit is the fuel or electricity plus normal

²¹ In previous footnote consultant quoted 5 SSP per 100 kg, even though this is less than 50 kg.

²² “Value Chain Analysis for Groundnuts,” Rojo Charity.

²³ Groundnuts must first be roasted.

wear and tear on the machinery. The man with the electrical powered unit pays 435 SSP for every 2,500 SSP that he earns from paste.²⁴ This calculates to 8.7 SSP per hour.²⁵ The diesel-powered paste maker incurs 7.5 SSP of diesel per hour. These paste makers act as wholesalers, relying on the women in the market to retail their paste.

2.3.3. Paste Sellers

Groundnuts processed into paste are sold by women in the market. Groundnut paste is consumed either directly, or used as part of a cooking ingredient. Sellers typically buy a basin (15kg) of shelled groundnuts at 120 SSP which is converted into paste at a cost of 1 SSP per kg. The paste is sold in small plastic sachets that are filled with three tablespoons of paste.²⁶ These sachets are sold (in Yei) for 1 SSP. One kilogram of paste can equate to 20 sachets and one basin can equate to 300 sachets.

Profit of Groundnut Paste

Sales of 300 sachets	300 SSP
Cost of shelled groundnuts for one basin	(120 SSP)
Cost of making the paste: 1 SSP per kg; variety <i>Red Beauty</i>	(15 SSP)
Cost of plastic bags	(10 SSP)
Gross profit ²⁷	155 SSP

The women work up to six days per week selling paste. Some women sell complementary items as a way to attract the one-stop-shopping clientele. When asked about the sales performance of paste, the women classified their sales periods into 'good markets' and 'bad markets.' In a good market, a paste seller can sell 40-50 sachets per day; in a bad market, that number drops to 10-15 sachets. Some women can sell an entire basin of paste in two to three days while some take up to four days. Practically all the paste sellers sit next to each other in the Yei markets—and in other markets such as Juba and Yambio as well—so it was not asked why some women can sell paste at different rates and in different quantities than other women. The women appeared to be set in continuing in the paste-selling business. The two main challenges the women noted were the high and fluctuating prices of groundnuts and the lack of capital to buy more groundnuts. The price for a sachet of groundnut paste is set at 1 SSP, as previous attempts to market the paste differently and at a higher price were not accepted by the customers.²⁸ If customers will not pay more than 1 SSP, then the women have limited margin space to make adjustments if the price of unshelled groundnuts increases significantly, thus limiting their ability to replenish their inventory. The women who are most qualified²⁹ can be linked up with farmers from an FBO to establish a credit line whereby the paste seller can acquire raw material on a loan basis, making payments on the groundnuts attached with a small interest rate.

²⁴ Consultant did not clarify this.

²⁵ 50 SSP earned per hour from 50 kg; $435/50=8.7$ SSP

²⁶ One tablespoon is 15gm liquid weight.

²⁷ Does not include other costs such as stall rent or local market fees. It is also not known what the cost for roasting is since roasting is done at home.

²⁸ Paste sellers were charging 2 SSP for four tablespoons of paste.

²⁹ The higher producers in terms of sales and turnover.

A few of the women also sell groundnut flour, which is mixed in varying proportions with cassava or millet flour. Groundnut flour can also be cooked with *matoke*, cooking bananas, and various greens, and can generally be used in sauces like the paste. The flour is prepared by roasting, then crushing, the groundnuts and removing as much oil as possible. A small sachet of flour sells for 1 SSP at small kiosks and shops. Groundnut flour is also sold in larger bags in Konyo Konyo and other markets in Juba.

2.4. Imported Cooking Oil

The cooking oil market in South Sudan is visibly dominated by imported brand name cooking oils such as Oki (Malaysia), Roki and Lukwano (Uganda), Bidco (Kenya), and Maëvo (Mozambique). These products are predominately palm oil-based or blended from palm and soybean oils. There is no market data indicating the quantities of imported cooking oil entering the South Sudan market; however, a visit to any local shop or the main open markets would reveal that all jerry cans, bottles, or cans containing cooking oil are imported. In Yei town, the consultant visited the main market on a few occasions to search for locally-produced cooking oil, but could only find two women selling raw palm oil. In the Konyo Konyo market in Juba, one can find cooking oil from Khartoum, especially sunflower or sesame oil. In other states of South Sudan, one can find different types of cooking oil, including locally produced groundnut oil in Wau, Western Bahr el Ghazal,³⁰ and locally-produced sesame oil in Aweil, Northern Bahr El Ghazal.³¹ Cooking oil is packaged in different volume containers from the 20L jerry can to the 600ml plastic Coke bottle repackaged from the same 20L jerry can. The price of each of these units varies on a per-volume basis depending on the wholesale or retail price point. Cooking oil repackaged in used plastic bottles represent the lower end of the retail price point at 3 SSP. The price of cooking oil in other volume containers such as 1L and 0.5L vary in price, not only by volume, but also by quality. A table follows of characteristics of various brands of cooking oil sold in the Yei and Juba markets:

Type of Cooking Oil/Brand/Weight	Price (SSP)	Location
No brand, 600ml plastic bottle, unknown oil, unknown origin	3	Yei market
Maëvo, 0.5L plastic bottle, refined palm oil, Mozambique	3	Small shop, Yei
Oki, 20L plastic jerry can, refined palm oil, Malaysia	110	Small shop, near Yei town market
Elosonor, 250 ml plastic bottle, sesame seed oil, Sudan	15	Jit Store and many small shops, Juba
Sunco, 2L plastic jerry can, refined palm oil, Indonesia	25	Small shop, Yei town
No brand (artisanal), 1L plastic bottle, unrefined palm oil, South Sudan (?)*	10	Main market, Yei town
Elianta (Bidco), 1L plastic bottle, sunflower oil, Kenya	28	Small shop, Konyo Konyo Market, Juba

*Possibly Congolese origin

³⁰ This was confirmed from the FARM Agricultural Program Coordinator in Yambio.

³¹ "Feasibility Study on the Defunct Oil Mill in Lakes State." Ministry of Commerce, Industry and Investment. Republic of South Sudan and Adroit Consulting. October 2012.

The consultant also conducted a quick survey of the cooking oils in Juba and could not find any groundnut oil in the market.³² The cooking oil market in terms of types, preferences, prices, and marketing varies across different regions.

2.5. Locally Produced Cooking Oil

For locally produced cooking oil, such as palm oil, there is no consistent standard of pricing and container volume. In Yambio, for example, one liter of locally produced palm oil sells for 4 SSP while in Yei, a liter sells for 10 SSP. Of course, the palm oil in Yambio might be different in quality from the oil in Yei, which could explain the difference.

Groundnut oil is used for frying; it has a high smoke point, a distinctive taste, and is a preferred for French fries and chicken. Groundnut oil has a moderate level of polyunsaturated fats. The ratio of raw groundnuts needed to produce oil is roughly 3:1. That is, for every 3 kg of groundnuts pressed, 1 kg of oil will be extruded. The ratio could vary depending on the oil content of the groundnut variety. As previously mentioned, the estimated oil content for Red Beauty is between 40–50 percent.

The traditional method of extracting oil involves roasting and grinding/crushing the groundnuts to a fine flour. The cake that remains is then boiled, forcing the oil to float to the top where it is skimmed and collected. This process is labor-intensive, and up to a third of the oil content of the cake cannot be extracted.³³ The preferable method of extracting oil is through a mechanical press. For small-scale oil extrusion, the nuts are forced through heated metal roller plates which crush the nuts; oil is subsequently extracted through a spindle or hydraulic press and the oil drained into a drip pan. The expeller unit could be powered by an electric or diesel-powered motor.

The types of oil press units available on the market for home or small-scale use are typically manufactured in China. They can process between 100-800kg per hour and, depending on their size, run on 5.5kW all the way up to 30kW. These units range in price from \$400 to \$5,000. All presses are suitable for all types of oilseed crops: sesame, cottonseed, sunflower, and groundnuts. The final output would still be crude and require further refining and clarification. After the oil has been extracted, the cake remaining from the crushed groundnuts, with protein content of 40 percent, is a high quality bi-product for animal feed.

There are no industrial-capacity edible oil facilities operating in South Sudan. Prior to the war, oil seeds were processed. The idea of reviving non-functioning oil mills, such as that of the Yirol Oil Mill in Lakes States, has been assessed as a business venture.³⁴

2.6. Feasibility of Groundnut Oil Production in the Greenbelt

Initiating a groundnut oil production project will depend on the feasibility of introducing a new cooking oil product to the market. A market already exists in parts of South Sudan, in Wau for example, for groundnut oil, and it is entirely possible to expand this market to other regions of the country, such as the Eastern, Western and Central Equatoria States. It would first be important to assess the consumer profiles in each market and identify their price points, tastes, preferences, or cooking habits to better segment the market. It

³² The consultant started in Konyo Konyo market in Juba and worked his way down to Jit Supermarket. He visited eight independent shops in addition to open markets and Jit.

³³ Akande, H.F. "Development and Performance Evaluation of a Groundnut oil Expelling Machine." Department of Mechanical Engineering, University of Ilorin, P.M.B. 1515, Ilorin, Nigeria. 2009.

³⁴ Ibid

should be noted that the majority of those interviewed during the field visits in Yei County are already aware of groundnut oil and some of the farmers even expressed interest in acquiring an oil press machine. Developing a project for groundnut oil production as part of a FARM Project value-addition strategy would be approached in the following manner:

Stage I: Developing the market for groundnut oil: learning the oil press technology, identifying test markets, adjusting the properties of the oil for quality, color, or taste, assessing the overall attractiveness and utilization of the product by the test markets.

Stage II: Developing a business plan in which it would be the goal of an entity to set up a formal structure to engage in groundnut oil as a business. This business plan would be based on the results of stage I, if successful, and would entail a formal marketing, supply chain and organizational plan.

2.6.1. Stage I: Marketing

During stage I, an entity would be selected to participate as part of this project. Likely it should be a cooperative union that is the umbrella entity for a number of FBOs. The initial portions of this stage should focus on training a number of skilled technicians from the member cooperatives of the cooperative union on the use of the oil press technology. This team must also be taught how to maintain the power unit. The technology is not too complex, but many of the farmers have no mechanical background, and this project would hinge on the operation of the oil press unit.³⁵ The cooperative union team should also be trained on the methodology of market development, which could be facilitated by a FARM marketing specialist.

Stage I would also be the phase to develop the product. The cooperative union should first consider if its member cooperatives have the appropriate variety of groundnuts for oil production. Ideally, the higher the oil content of the groundnut, the more efficient oil extrusion will be. However, the cooperative may have to work with less appropriate varieties, i.e. those that they are currently cultivating. The press produces crude groundnut oil with some residual debris or water. The end product has to be clean, pure and of the best quality possible. It would be helpful to recruit a consultant, a specialist in edible oils, to work with cooperatives in developing the groundnut product.

The cooperative union would prepare a plan that would identify a test market—the types of consumers, their location, and how to market the groundnut oil. Marketing would involve, among other tasks, packaging, branding, and wholesale selling. The cooperative union should not deviate too much from the manner in how cooking oil is packaged in the market. Pricing is also important. The previous table on cooking oil prices gives a good range of different price points. The indicated price range for a liter of cooking oil is 6 SSP to 15 SSP. The cooperative should test market the groundnut oil along a range of prices, but it is suggested they do not dip below 8 SSP per liter at the retail level.

The test marketing period would also give the cooperative union a trial indication of market demand for groundnut oil and how much the cooperative union membership could produce. The cooperative could produce a small quantity to begin with, perhaps no more than one metric ton, i.e. enough to be sold in a short time, but not so much that the loss would be damaging. The cooperative union could then allocate the rest of the calendar days to working as the new service provider for pressing groundnut or even sesame oil. The union might charge within a range of 1 to 2 SSP per kg to press the oil. Providing oil pressing services is also another way to generate awareness of groundnut oil.

³⁵ The FARM Agriculture Production Coordinator in Yei was involved in similar project in Northern Bahr el Ghazal where women's groups were given the same oil presses that are being recommended for this project. The groups were not properly trained on the use of the oil presses and the project eventually failed.

The development phase should also be the period when the cooperative union starts to develop the cost structure of groundnut production. The cooperative would be looking at fuel and maintenance costs for an eight horsepower, 5.5 kW, motor, and the cost of cleaning out the cylinder press. For this oil press, the cooperative can estimate operating costs of 11–13 SSP per hour of operation.³⁶ The major cost that the cooperative will have to review will be that of raw materials; a bag of groundnuts ranges between 100 SSP to 200 SSP. Each bag would produce between 10–15kg of oil, which could gross in monetary value between 100 SSP to 150 SSP. Since the cooperative union is also evaluating the viability of a groundnut oil business, the member cooperatives need to determine how to cover their costs.

It is difficult to predict how long it would take to develop the market for groundnut oil. The cooperative union, in collaboration with the FARM project staff, would have to establish regular monitoring and evaluating schedules to assess progress.

2.6.2. Stage II

Stage II would build off the lessons learned and success during the market development phase. At this stage, groundnut oil production would elevate to a larger scale to supply the market. The cooperative union would have to organize and structure a supply chain from which they could source a stable supply of groundnuts. The volume would depend on their market, but they would also need a scale of production which would permit them to spread out their costs over a large quantity of groundnuts production. This would basically mean having rather large plots of contiguous land on which they could produce groundnuts on a more cost-efficient basis by adopting best practices, e.g. *single-pass plowing*. Combined with good yielding seed and cultural practices the cooperative would need to get the unit cost of a bag of groundnuts as low as possible—between 80 SSP to 120 SSP. The price per bag of groundnuts is a serious limiting factor because a farmer can fetch 150 SSP for a bag of groundnuts, better than if he sold the bag to an oil processor for less.³⁷ Also, without sorting or grading, there is no way to segment the groundnut supply into first and second-sort quality. By doing this, better quality groundnuts could retain a higher market price and the lower quality groundnuts would be channeled into processing. Currently all groundnuts are mixed and buyers incur the cost of sorting.

³⁶ These are estimates derived by the consultant for equipment, maize and groundnut shellers, with similar motors. The rates are based on 1 SSP/hr wear and tear, fuel consumed at .71/hr, fuel at 7 SSP/hr, and the labor cost of operating the equipment at 2 SSP/hr.

³⁷ Or, if the processor paid that 150 SSP, he might not break even or make a profit from oil production.

3. RECOMMENDATIONS

3.1. Buyer/Trader/Retailer/Paste Maker

Market intermediaries—trader or retailer—are often constrained by their ability to replenish their inventory because of lack of capital. A recommendation would be to link up these intermediaries with the cooperative union and establish a credit line agreement whereby they take an agreed-upon quantity from the cooperative and repay with an installment plan and a small interest. If this is already done, the FARM project could formalize it by arranging credit applications and written agreements. The only option for credit, at least in Yei, is Finance South Sudan Limited.

Value Addition

- Groundnut flour/groundnut oil/groundnut meal cake: The FARM project could hire a food technologist to assess or develop the food product. A nutritionist could also help educate project participants in the nutritional properties of these food products and crops.
- Groundnut shelling: Since shelling represents a significant gain in value addition, the project could support such shelling services that would be available to the public for a fee. These shelling units could be offered through some sort of financing scheme. Cooperative unions that will receive these units should be encouraged to sell these services to the public. The FARM project should closely monitor the shelling equipment that it has provided to the cooperative unions to ensure the unions are maintaining them and allowing public access. The project might also look into larger-capacity shelling units as the scale of production increases.
- Groundnut oil production: The project could pilot an activity to develop the market for groundnut oil. A combined training and equipment provision package in which the project would subsidize the purchase of an oil press (recipients pay 20 percent) and the cooperative would be trained in how to operate the unit and acquire advanced marketing skills for test marketing and developing a new product. A value-addition specialist, preferably in edible oils or groundnuts, could be contracted to develop a plan for quality production and control.
- The oil press units, made in China, can be purchased in Uganda.³⁸ Prices range, with or without a power unit, from \$400 to \$2,000; the consultant received a quotation for \$1,290. Such a unit³⁹ can produce between 80–125 kg/hr, or, powered by an 8 HP 5.5 kW motor, 1,900 to 2,400 kg/24hr. Since these units are heavy and difficult to move, one unit could be located in the more rural payam centers. In these areas, households do not have the same access to cooking oil as in the larger towns. An oil press unit located in this setting could function as an income-generating activity and at the same time generate exposure to groundnut oil.

³⁸ The same dealer that sold the cooperative union equipment also sells the oil press.

³⁹ The model is YZS-80.